

REMARKS

Summary of the Office Action

Claims 44-50 are rejected under 35 U.S.C. § 112, second paragraph for indefiniteness.

Claims 44-50 are rejected under 35 U.S.C. § 102(b or e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent Publication No. 2003/0139122 to Lawing (“Lawing”), U.S. Patent Publication No. 2002/0076933 to Kawamura et al. (“Kawamura”), or U.S. Patent Publication No. 2001/0044257 to Southwick (“Southwick”).

Claims 44-50 are rejected under 35 U.S.C. § 102(b or e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Japanese Patent Publications JP 11-126765 (“JP ‘765”) and JP 10-296628 (“JP ‘628”).

Summary of Response to the Office Action

Applicants have amended claim 44.

Claims 44-50 are pending.

All Claims Define Allowable Subject Matter

Claims 44-50 are rejected under 35 U.S.C. § 112, second paragraph for indefiniteness. The limitation in claim 44 “target distribution” has been amended to “desired distribution” to more clearly define the invention. The target or desired distribution of an amount of polishing simply refers to the goal, or end result of the polishing process, i.e., how smooth the surface must be for the polishing process to have been satisfactory. “[A] simulation method” recited in line 10 of claim 44 has been amended to recite “the simulation method” to clarify that it refers to the

simulation method recited on line 6 (previously line 5) of claim 44. The phrase “predicts an amount of discrete portions” in claim 44 has been amended to recite “predicts the amount of polishing of discrete portions” to clarify that the phrase is referring to the amount of polishing of discrete portions of the surface to be polished. The phrase “and using” has been amended to “and uses” in claim 44. “Comprising” has been amended to “consisting of” in the Markush terminology of the last paragraph of claim 44 to close the group to the specific indicator methods claimed and to distinguish over the indicator methods described in the references.

Claims 44-50 are rejected under 35 U.S.C. § 102(b or e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent Publication No. 2003/0139122 to Lawing (“Lawing”), U.S. Patent Publication No. 2002/0076933 to Kawamura et al.

(“Kawamura”), or U.S. Patent Publication No. 2001/0044257 to Southwick (“Southwick”).

Claims 44-50 are rejected under 35 U.S.C. § 102(b or e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Japanese Patent Publications JP 11-126765 (“JP ‘765”) and JP 10-296628 (“JP ‘628”). Applicants respectfully traverse these rejections.

One of the key limitations of claim 44 is “wherein the simulation method is characterized by a step which predicts the amount of polishing of discrete portions of the surface using an indicator which determines a height distribution of the face of the polishing body with reference to the substrate when no pressure is applied to the polishing body, and uses the height distribution and the elastic constant in calculations performed in the simulation stage” This limitation is explained on pp. 35-38 and the principle of the limitation is illustrated in Figures 13(a) and (b). The critical heights in the present invention are the overall heights of the polishing

pad – referred to as the “height distribution of the surface with reference to the substrate when no pressure is applied” – dimension “d” being one such height in Figure 13(a).

Only Lawing even makes reference to this key limitation. While Southwick mentions the height h_1 of pyramidal raised features 43 above a base elevation E, as shown in Figure 3 and described in paragraph [0025], there is no mention of the overall height of the polishing pad. Nor is there any mention in Southwick of the elastic properties of the polishing pad which make the measure of overall height important in the present invention. Note that although the limitation of the elastic constant being used in calculations has been explicitly added, such a limitation was implicit in the original claim 44 in that the height distribution with reference to the substrate is important only because of calculations performed using the height distribution and the elastic constant. The only reason the heights of the pyramidal features 43 in Southwick are important is that the polishing surface area varies with the height of those features. While JP 11-126765 mentions elastic modulus, the method involves “dividing a material 1 to be polished or an abrasive cloth 2 into multiple parts according to elastic modulus” This is in contrast to the present invention in which the elastic modulus of the polishing body is a constant.

One limitation neither disclosed nor suggested by any of the cited references is “the indicator tool comprises at least one indicator selected from a set consisting of the number of times that a dressing process is performed on the polishing body, the cumulative time of dressing processes performed on the surface by the polishing body, and the cumulative time of polishing performed on the surface by the polishing body.” The specification of the present invention explains on pp. 50-51 that predictions of the height distribution are made possible by accumulating data for similar polishing pads in similar circumstances and storing the data.

Lawing discloses in paragraphs [0031] and [0032] analyzing initial pad surface texture, and analyzing surface texture during operation using surface texture measuring devices. However, there is no disclosure or suggestion in Lawing of using stored data on varying height distributions to update predictions as a polishing body is consumed as disclosed and claimed in the present invention. This limitation of the present invention ensures that the polishing pad is being used for polishing a greater percentage of the time (as opposed to stopping polishing to update measurements of height distribution) and/or provides more accurate predictions of polishing. The Examiner has offered no motivation that would lead one of ordinary skill in the art to replace the surface texture measuring devices of Lawing with the prediction methods recited in claim 44.

Furthermore, none of the cited references discloses or suggests the limitation of the judgment stage in the polishing process. In light of the foregoing, Applicants respectfully submit that claim 44 and its dependent claims 45-50 are in condition for allowance.

CONCLUSION


In view of the foregoing, Applicants respectfully request reconsideration and the timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicants' undersigned representative to expedite prosecution.

If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

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